

ABSTRACT

[Abstract]

[Object] To stably generate plasma at atmospheric pressure.

[Solving Means] There are provided a tubular casing 10 into which a gas and a microwave are introduced, a hole 30 provided in a bottom surface of this casing, and a columnar conductor 40 which is provided in an axis direction of the casing, a bottom surface of the conductor 40 having a contour placed inside the contour of the hole. A minute gap A formed between the contour of a bottom surface 41 of the conductor 40 and the contour of the hole, a coaxial waveguide formed of the conductor and the casing, and an insulating film 22 formed at least on a contour portion forming the hole at the minute gap are provided. In the structure described above, the microwave is guided to the minute gap by the coaxial waveguide, and the gas is made to pass through the minute gap, so that the gas is placed in a plasma state at the minute gap. The microwave is a pulse wave and is duty-controlled, and the contour portion forming the hole 30 is cooled with a cooling medium from the inside of an electrode 20. Accordingly, the increase in plasma temperature can be prevented, and as a result, stable plasma can be generated.

[Selected Figure] Fig. 1